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RC 1640 BC 305

SIEMENS

LEVEL METER −20 TO 0 DBM

200 to 6000 c/s · Rel 3 D 352a1a

Full Information

Rel gesamt 3 D 352a1a En · Edition July 1962

SIEMENS

LEVEL METER –20 TO 0 DBM

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SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK · MÜNCHEN

1. Application

This section describes the Type Rel 3 D 352 Transmission Measuring Set which is a small portable instrument capable of measuring transmission losses from 0 to 20 db over the frequency range 200 to 6000 c/s when using a testing power of 1 milliwatt. Losses between 20 and 30 db can be read with good accuracy on the large panel meter and the set is designed for measurement on both 600-ohm and 900-ohm circuits. This set does not employ vacuum tubes or transistors and therefore does not require the use of batteries or external power.

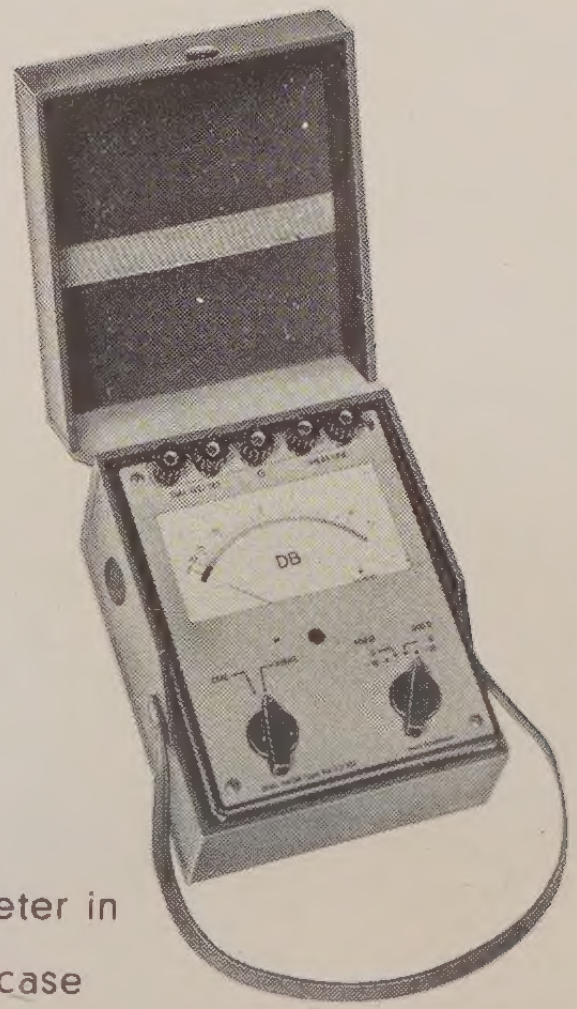

Fig. 1 Level meter in leather case

2. Electrical Data

Frequency range . . . . . 200 c/s to 6000 c/s

Measuring range (full-scale deflection 1 db higher)

with levels across 900 ohms . . . . . -10 dbm, 0 dbm

with levels across 600 ohms . . . . . -10 dbm, 0 dbm

Smallest measurable level . . . . . -20 dbm

Smallest readable level . . . . . -30 dbm

Measuring error at 1000 c/s and 20 °C

as referred to full-scale deflection . . . . . ±0.3 db

Frequency response of indication

as referred to 1000 c/s . . . . . ±0.2 db

Temperature dependence of indication (in measuring range)

in the temperature range 20 °C ±10 °C . . . . . ≦ ±0.04 db/°C

Input impedance in the range 200 c/s to 6000 c/s

reconnectable . . . . . 600 Ω/900 Ω

Input resistance for DC

with Z = 600 ohms . . . . . ≦ 800 Ω

with Z = 900 ohms . . . . . ≦ 1200 Ω

Highest permissible direct voltage on voice circuit . . . . . up to 52 v

3. Equipment Circuit and Features

3.01 The Transmission Measuring Set is assembled in a box consisting of plastic and light-metal parts, which in turn is fitted into a leather case complete with cover and carrying strap. The set measures 5 x 6.4 x 3.4 inches.

Figure 1 shows a view of the instrument and its case.

3.02 The face view of the measuring set panel is shown in Figure 2. The equipment as shown consists of a meter, two rotary switches and two sets of combination jack-top binding posts. The internal construction of the instrument is shown in annexed Figs. 1 and 2.

3.03 The meter used is a Siemens & Halske taut strip suspension microammeter employing a germanium diode rectifier circuit. It has a single scale graduated in db from +1 to -20. The scale is calibrated in 0.5-db steps between +1 and -10 db and in 1-db steps between -10 and -20.

3.04 The binding posts are provided for making tip, ring, and sleeve connections via cords terminating on one end in standard banana type plugs and on the other in the plug type required for connection to the apparatus under test. Two jacks (Type S-12 B) are connected in parallel to these posts so that standard cords can also be used in connection with systems equipped with these cords. Further jacks for adjustment to the systems can be subsequently installed on two brackets "A" (see Fig. 2 and annexed Fig. 1) which can be moved in the depth dimension. The MEAS LINE and DIAL TEST SET jacks are connected

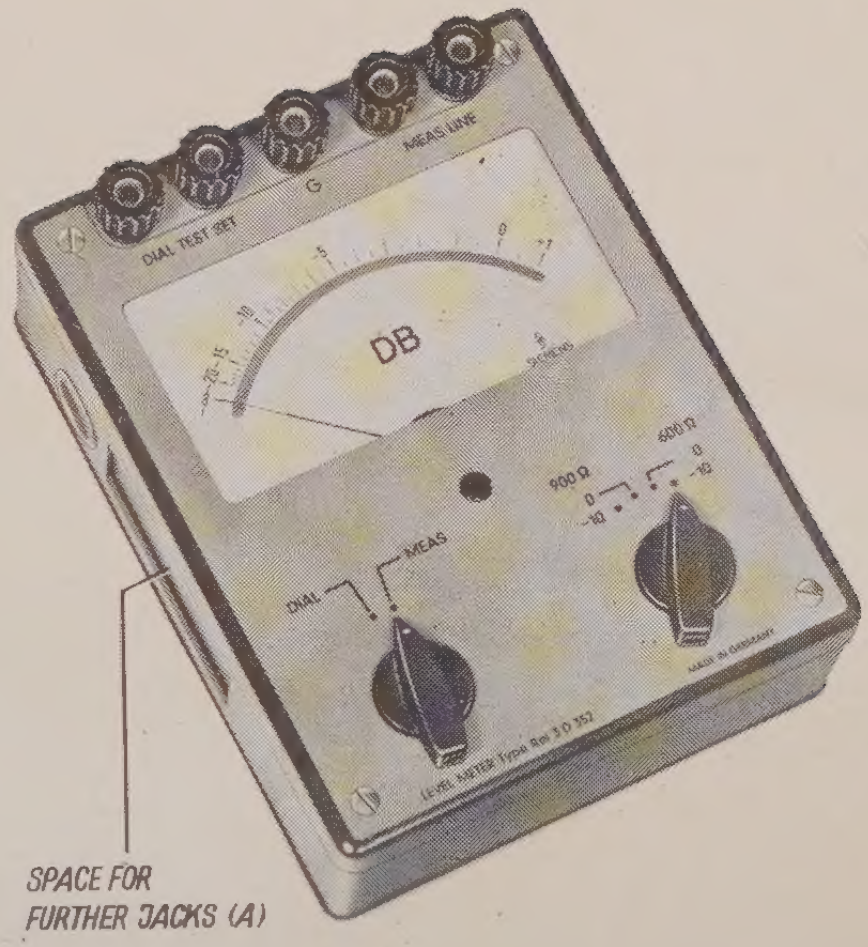

Fig. 2 Level meter
Type Rel 3 D 352 a1a

together in the DIAL position of S1 for establishing connections by means of a handset or other device. S1 is designed in such a way that no interruption occurs during the reconnection to MEAS, e.g. the connection established in the position DIAL is connected to the measuring circuit.

3.05 S2 is provided for the dual purpose of selecting the input impedance (600 ohms or 900 ohms) and the full scale sensitivity of the instrument (0, -10 db) for each of these two impedance settings.

3.06 The circuit of the Level Meter is shown in schematic form on the attached drawing Rel str 3 D 352. .

3.07 After removing the bare screw at the rear of the leather case, the device can be taken out. After unscrewing of the rubber legs the bottom plate and the lower frame can be removed. Now the etched plate can be swung out as shown in the annexed Fig. 1. All building components are now accessible. The device can be taken out after removal of the control knobs and the front panel as well as loosening of two fastening screws; for details refer to the annexed Fig. 2.

4. Transmission Performance

4.01 The accuracy of the Rel 3 D 352 set for 1000-c/s measurements is ±0.3 db for full-scale deflection at 68 °F. A variation of temperature over the range from 50 °F to 86 °F (20 °C ± 10 °C) will result in less than ±0.025 db/°F (±0.04 db/°C) change in sensitivity over the entire measuring range.

4.02 This measuring set has a practically flat receiving characteristic over the frequency range from 200 to 6000 c/s, the maximum deviation being ±0.2 db.

4.03 The input impedance of the Rel 3 D 352 set is switchable to either 600 ohms or 900 ohms, and the impedance is constant as a function of frequency over the range 200-6000 c/s. The DC resistance of the input is <800 ohms for the 600-ohm position, and <1200 ohms for the 900-ohm position. The maximum permissible DC voltage at the telephone circuit is 52 v.

5. Instructions for Use

5.01 The Level Meter should be operated in the horizontal position only during measurements.

5.02 The mark -∞at the left of the meter scale indicates the correct position of the meter pointer for zero current input. The only time when the meter zero adjustment screw should be adjusted is when, with zero current input, it is necessary to bring the pointer into accurate alignment with this mark. The zero adjustment screw is located directly below the meter window.

5.03 As stated in part 2, connections to external circuits are made by means of the jack-top binding posts in the measuring set. In order to provide for connecting to the various types of switchboards, test boards, PBX's, subscriber sets etc., a universal tip, ring, and sleeve connector is used which permits connection of any standard 2 conductor test cord terminating in banana plugs, P clips or spade lugs. Such cords may be fitted with plugs e.g. Bell type 241, 309, 310 or other fittings at the other end.

5.04 When the Rel 3 D 352 set is used for loss measurements, the loss will be indicated by the sum of the meter reading and the attenuator setting S2. Care must be exercised that the measurement is made at the proper impedance setting of S2.

5.05 When this set is used for measuring transmission gain on circuits, a suitable attenuator (e.g. Bell type 5 A or other) should be inserted ahead of the measuring set if the level exceeds 1 milliwatt at the output of the device under test, and ahead of the specimen if the output level does not exceed 1 milliwatt.

5.06 Where an external attenuator is used in the measurement of gain the following applies, if the output level of the transmitter amounts to 0 dbm:

Gain = Setting of attenuator + S2 + Scale Reading.

5.07 From time to time, the calibration of the Rel 3 D 352 should be verified by connection to a 1000-cycle source of 1 milliwatt test power and comparing the reading with another Transmission Measuring Set (e.g. Bell Type 7A or 22A).

5.08 In general transmission loss can be measured by connecting the circuit involved to the MEAS LINE jacks of the Rel 3 D 352 set and to a source of testing power in accordance with the procedure given in other sections of the A series of Bell System Practices. If a handset or other testing facility is required to establish a connection to the testing power, it is connected to the DIAL TEST SET jacks, and S1 is operated to DIAL. After the connection is established, test tone can be heard on the circuit, and the switch S1 should be restored to the MEAS position, thus connecting the testing power to the meter circuit.

S2 should be adjusted for the correct impedance of the circuit under test. With S2 set at 0 db the meter reads directly the transmission loss between the source of testing power and the Rel 3 D 352. If the measured loss is more than 10 db, S2 should be advanced to the -10 position. With the S2 operated to -10 the loss is obtained by adding the meter reading algebraically to -10.

5.09 For 1000-c/s measurements of subscriber loop or interoffice trunk facilities the set may be used in the same manner as the 12 A or B Transmission Measuring Set or the 13 A and 21 A Transmission Set in conjunction with the 2 AB Auxiliary Transmission Test Set. Its use affords considerable simplicity of operation,

inasmuch as it is designed for measurements on both 600 and 900-ohm circuits and incorporates a holding facility and talk circuit. The only external accessories required consist of a 1011 or equivalent type handset and the appropriate connecting cords. As an example, in the measurement of the 1000-c/s loss of a subscriber loop, it is only necessary to connect the LINE jack of the measuring set to the subscribers connecting block and to connect either the subscribers telephone set or the installers 1011 handset to the DIAL TEST SET jack. The connection is then established to the exchange milliwatt supply, and the measurement carried out as in paragraph 5.08 above.

5.10 In those areas which have installed multifrequency milliwatt supplies (e.g. Siemens & Halske Type Rel 3 W 331), the employment of this set is particularly convenient. These multifrequency sources usually contain a start tone of longer duration than the remaining tones (in some cases this is 1000 c/s, in others 300 c/s), which indicates the beginning of the frequency sequence. For this application the connection to the source of testing power is established, and the frequency sequence is monitored by means of the handset. S1 is then switched to MEAS, and the transmission loss of the loop or trunk is observed and noted at each of the test frequencies.

This latter method of testing affords significant advantages over the measurement of the 1000-c/s loss as it gives a much better indication of the transmission quality of the circuit under test than is possible by means of a single frequency measurement.

5.11 The Rel 3 D 352 Transmission Measuring Set is ruggedly constructed and requires no special handling or care other than that which is normally given to a pointer instrument of good quality. The use of a taut ribbon suspension meter makes the possibility of damage to the meter movement highly unlikely, and the use of selected components of the highest quality insures the long term stability of the calibration of the set.

6. Accessories, Dimensions, and Weights

Description	Type	Dimensions in ft./in. (mm)	Approx. weight in lb (kg)
Level meter			
200 to 6000 c/s	Rel 3 D 352a1a	5"x6.4"x3.4" (127x163x87)	2.9 (1.3)
Accessories			
1 leather case	C 44165-A7-A1	5. "x7.1"x3.9" (144x180x100)	1.1 (0.5)
at option			
2 connecting cords	depending on specimen to be measured		

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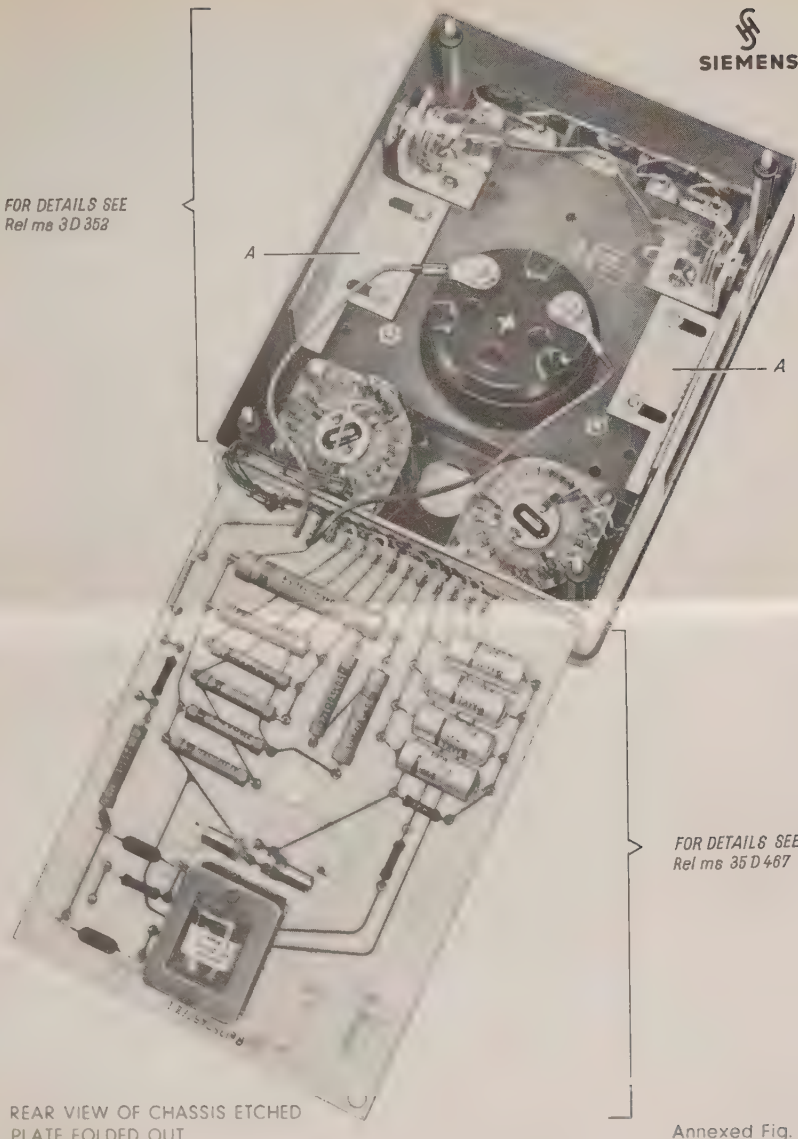
FOR DETAILS SEE
Rel ms 3D 353



FOR DETAILS SEE
Rel ms 35 D 467

REAR VIEW OF CHASSIS ETCHED
PLATE FOLDED OUT

Annexed Fig. 1

REMOVAL OF THE INSTRUMENT Annexed Fig. 2

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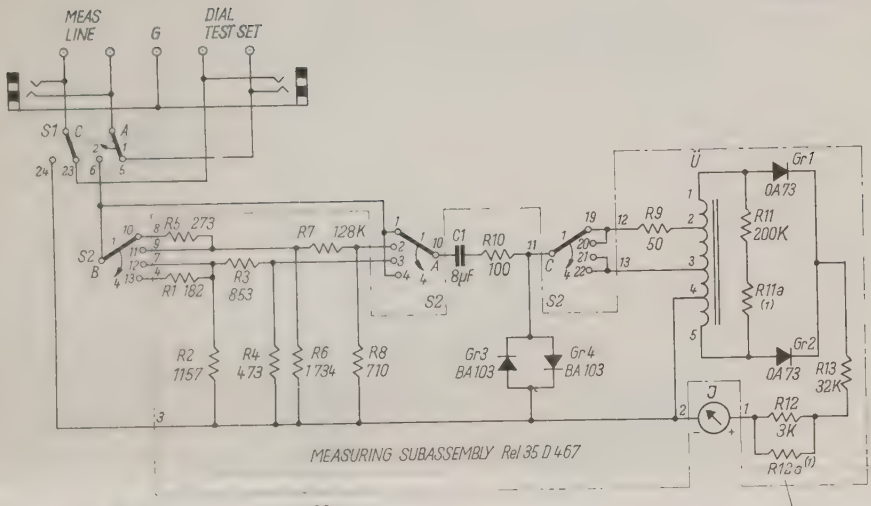

S1

POS	
1	DIAL
2	MEASURE

S2

POS	LEVEL
1	-10 DBM 900Ω
2	0 DBM 900Ω
3	0 DBM 600Ω
4	-10 DBM 600Ω

(1) VALUE DETERMINED IN TESTING

R12a IN SERIES WITH, OR IN PARALLEL TO R12

LEVEL METER 0 TO 20 DBM	Rel str 3D 352 a1a En	Blatt – (– Blätter)

Siemens & Halske Aktiengesellschaft Wernerwerk für Weitverkehrs- und Kabeltechnik	Ausgabe					E							
	Datum					26.1.62							
	And. Mittlg.					23.1.23							
	Betr. Blatt					227							
	Name					Hartmann							
	Verteiler		Normgeopr.		Ersatz für			Ersetzt durch					

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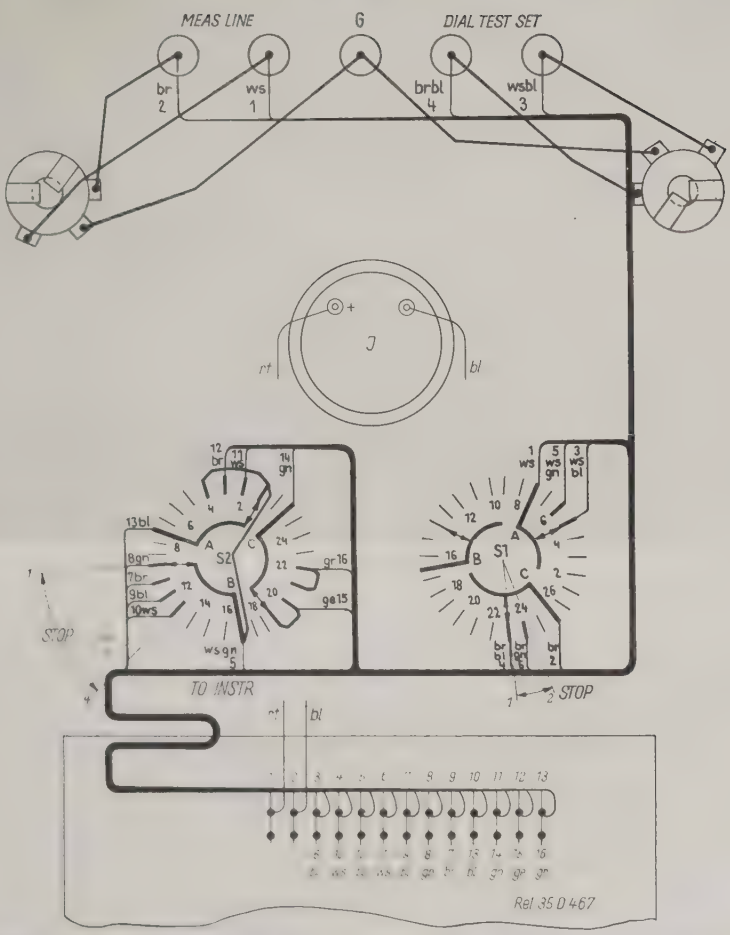
REAR VIEW



LEVEL METER 0 TO 20 DBM														Rel ms 3D352a1a En
Siemens & Halske Aktiengesellschaft Wernerwerk für Weitverkehrs- und Kabeltechnik	Ausgabe				I	II	III							
	Datum				27.8.61	6.12.72	29.6.62							
	Änd. Mitteg.					23.07.73	23.12.3							
	Betr. Blatt													
	Name													
	Verteiler		Normgegr.		Ersatz für			Ersetzt durch						

Rel OE 650

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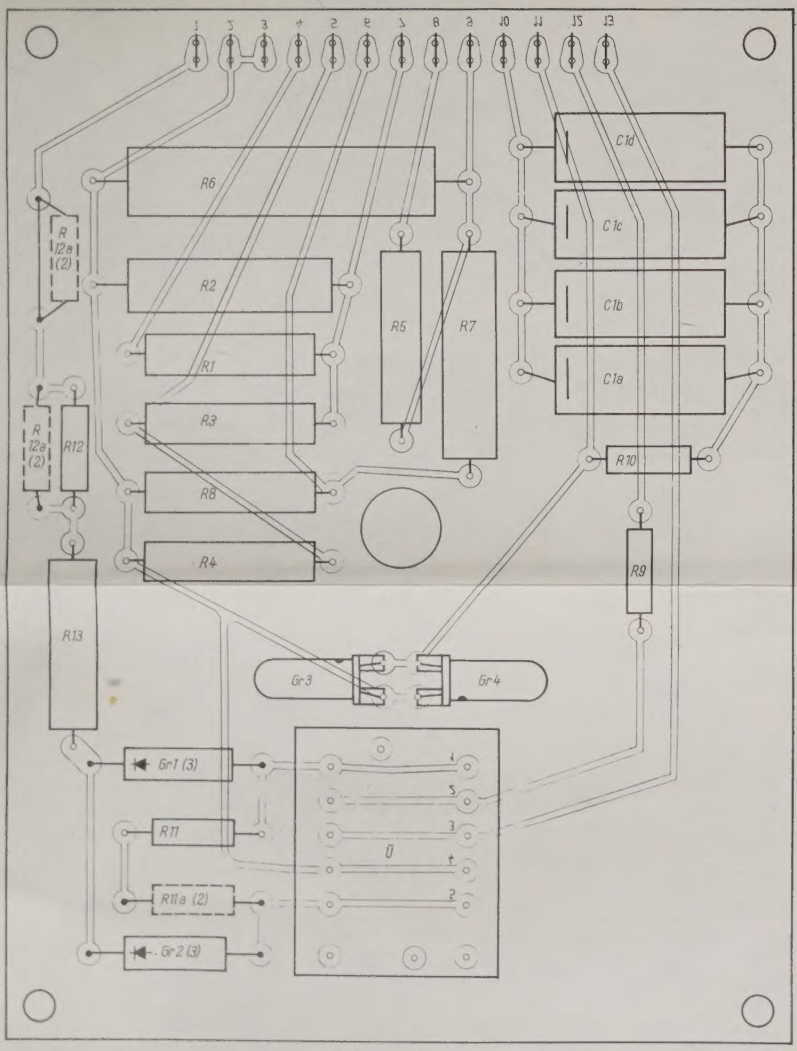
COMPONENT END



- SOLDERING PIN Rel ltg 642f
- SOLDERING LUG Rel ltg 642c
(2) VALUE DETERMINED IN TESTING
(3) IN SOLDERING USE A HEAT SINK, e.g. PLIERS WITH COPPER JAWS

MEASURING SUBASSEMBLY FOR LEVEL METER Rel 30 352				Rel ms 35 D 467 En
Siemens & Halske Aktiengesellschaft Wernerwerk für Weitverkehrs- und Kabeltechnik	Ausgabe	A		
	Datum	5.4.61		1961
	Änd. Mitteilg			
	Bem. Blatt			
	Name	Grimm Arndt		Grimm Arndt
	Vorbehalt		Normgeprüft	Ersatz für:
				Ersetzt durch:

98988

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